

AMENDMENTS TO THE CLAIMS

This listing of the claims will replace all prior versions and listings of the claims in this application.

Listing of the Claims:

1. (Currently amended) A zeolite material of the pentasil type ~~having~~ comprising an alkali metal and alkaline earth metal content of not more than 150 ppm and a molar ratio of Si to Al of from 250 to 1500, wherein at least 90% of the primary particles of the zeolite material are spherical and at least 95% by weight of the spherical primary particles have a diameter of less than or equal to 1 μm .

2. (Currently amended) The zeolite material as claimed in claim 1, wherein a portion of the zeolite material ~~at least partly~~ has the structure type ZSM-5.

3. (Currently amended) The zeolite material as claimed in claim 1 ~~or 2~~, wherein the alkali metal and alkaline earth metal content of the zeolite material is not more than 100 ppm.

4. (Currently amended) The zeolite material as claimed in ~~any of claims 1 to 3~~ claim 1, wherein the diameter of the spherical primary particles is ~~in the range of~~ from 50 to 250 nm.

5. (Currently amended) The zeolite material as claimed in ~~any of claims 1 to 4~~ claim 1, wherein the molar ratio of Si to Al is in the range of from 250 to 750.

6. (Currently amended) The zeolite material as claimed in ~~any of claims 1 to 5~~ claim 1, wherein the molar ratio of Si to Al is in the range of from 350 to 600.

7. (Currently amended) A molding containing ~~at least one~~ the zeolite material according to ~~any of claims 1 to 6~~ claim 1 and at least one binder material.

8. (Currently amended) The molding as claimed in claim 7, ~~additionally containing SiO₂ as~~ wherein the binder material includes SiO₂.

9. (Currently amended) The molding as claimed in claim 7, ~~or 8, containing wherein the binder material in a range of~~ is present from 5 to 80% by weight, based on the total weight of the dried ~~and optionally calcined~~ molding.

10. (Currently amended) The molding as claimed in ~~any of claims 7 to 9~~ claim 9, having a specific surface area of at least 350 m²/g, ~~containing pores having~~ and a pore volume of at least 0.6 ml/g.

11. (Currently amended) The molding as claimed in ~~any of claims 7 to 10~~ claim 10, having a cutting hardness of from 2 to 15 N.

12. (Currently amended) A process for the preparation of a zeolite material ~~according to any of claims 1 to 6~~, comprising the steps

(i) ~~preparation of~~ providing a mixture containing at least one SiO₂ source, at least one aluminum source and at least one template compound, wherein the mixture contains not more than 150 ppm of alkali metal and alkaline earth metal and wherein the at least one SiO₂ source and the at least one aluminum source are used in a ratio which permits the formation of a crystalline material having a molar ratio of Si to Al of from 250 to 1500;

(ii) ~~reaction of the compounds contained in~~ reacting the mixture to give a mother liquor containing crystalline material, said crystalline material containing at least a portion of at least one template compound;

(iii) ~~separation of~~ separating the crystalline material from the mother liquor;
and

(iv) ~~removal of~~ removing the at least one template compound from the crystalline material.

13. (Currently amended) The process as claimed in claim 12, wherein a the SiO₂ source includes tetraalkoxysilane ~~is employed as SiO₂ source~~ and the template compound includes at least one tetraalkylammonium hydroxide ~~is employed as template compound~~, and the mixture according to (i) additionally contains water.

14. (Currently amended) The process as claimed in claim 13, wherein ~~the~~ alcohol which is formed in the mixture according to (i) is distilled off prior to ~~the reaction~~ reacting the mixture according to (ii).

15. (Currently amended) The process as claimed in ~~any of claims 12 to 14~~ claim 14, wherein the ~~reaction~~ reacting the mixture according to (ii) is ~~carried out~~ conducted at a temperature ~~in the range of~~ from 150 to 180°C in an autoclave with a reaction time of 1 to 48 hours.

16. (Currently amended) The process as claimed in ~~any of claims 12 to 15~~ claim 12, wherein the crystalline material separated according to (iii) is ~~at first dried according to (iv)~~ dried at a temperature ~~in the range of~~ from 100 to 160°C and ~~is subsequently then~~ calcined at a temperature ~~in the of range~~ from 450 to 700°C.

17. (Currently amended) The process as claimed in ~~any of claims 12 to 16~~ claim 12, wherein[,] after step (iv), the zeolite material is exposed to water in an autoclave and is subsequently dried at a temperature ~~in the range of~~ from 80 to 160°C and is subsequently calcined at a temperature ~~in the range of~~ from 400 to 750°C.

18. (Currently amended) A zeolite material of the pentasil type ~~having~~ obtainable by a process according to claim 12, said zeolite material comprising an alkali metal and alkaline earth metal content of not more than 150 ppm and a molar ratio of Si to Al in a range of from 250 to 1500, wherein at least 90% of the primary particles of the zeolite material are spherical and at least 95% by weight of the spherical primary particles have a diameter in the range of

from less than or equal to 1 μm , ~~obtainable by a process according to any of the claims 12 to 17~~
~~claim 12.~~

19. (Currently amended) A process for the production of a molding ~~according to any of claims 7 to 11,~~ comprising the steps

- (I) ~~preparation of a mixture containing~~ providing a zeolite material according to ~~any of claims 1 to 6, or a zeolite material obtainable by a process according to any of claims 12 to 17,~~ of the pentasil type comprising an alkali metal and alkaline earth metal content of not more than 150 ppm and a molar ratio of Si to Al of from 250 to 1500, wherein at least 90% of the primary particles of the zeolite material are spherical and at least 95% by weight of the spherical primary particles have a diameter of less than or equal to 1 μm and at least one binder material to form a mixture;
- (II) kneading of the mixture;
- (III) molding of the kneaded mixture to give at least one molding;
- (IV) drying of the at least one molding; and
- (V) calcining of the dried molding.

20. (Currently amended) The process as claimed in claim 19, wherein the binder employed ~~according to (I)~~ is a SiO_2 -containing binder material.

21. (Currently amended) The process as claimed in claim 19 ~~or 20,~~ wherein the mixture according to (I) ~~additionally contains~~ further comprises at least one pore forming agent.

22. (Currently amended) A molding, obtainable by a process according to ~~any of claims 19 to 21~~ claim 19.

23. (Currently amended) Use of a zeolite material according to ~~any of claims 1 to 6, or of a zeolite material obtainable by a process according to any of claims 12 to 17, or of a~~

~~molding according to any of claims 7 to 11, or of a molding obtainable by a process according to any of claims 19 to 21, claim 1 as a catalyst~~

24. (Currently amended) The use as claimed in claim 23, wherein the catalyst is ~~employed for~~ used in the synthesis of triethylenediamine.

25. (Currently amended) A process for the preparation of triethylenediamine or of an alkyl-substituted derivative thereof by reacting at least one starting material which has a structural unit according to formula (I)



where R₁, R₂, R₃ and R₄, independently of one another, are hydrogen or an alkyl-group having 1 to 4 carbon atoms and X is an oxygen or nitrogen atom, wherein the reaction is carried out over a zeolite catalyst which contains a zeolite material according to ~~any of claims 1 to 6 or a zeolite material obtainable by a process according to any of claims 12 to 17~~ claim 1.

26. (Currently amended) The process as claimed in claim 25, ~~which comprises reacting a~~ wherein the starting material consisting of is selected from

(A) ~~x% by weight of~~ piperazine (PIP), and

(B) ~~y% by weight of~~ ethylenediamine (EDA)[,]

~~where x + y = 100 and 0 ≤ x ≤ 100 and 0 ≤ y ≤ 100~~ or a mixture thereof.

27. (Original) The process as claimed in claim 26, wherein the starting material is reacted in at least one solvent or diluent.

28. (Currently amended) The process as claimed in ~~any of claims 25 to 27~~ claim 26, wherein at least a portion of the zeolite material ~~of the catalyst is used~~ is provided in the H form.

29. (Currently amended) The process as claimed in ~~any of claims 26 to 28~~ claim 26, wherein ~~x is 0~~ the starting material is ethylenediamine, and the reaction is carried out at a temperature ~~in the range~~ of from 300 to 400°C and a pressure ~~in the range~~ of from 0.01 to 50 bar.

30. (Currently amended) The process as claimed in ~~any of claims 26 to 28, wherein y is 0~~ claim 26, wherein the starting material is piperazine, and the reaction is carried out at a temperature ~~in the range~~ of from 300 to 450°C and a pressure ~~in the range~~ of from 0.01 to 50 bar.

31. (Currently amended) The process as claimed in ~~any of claims 26 to 28, wherein x and y are unequal to 0, and~~ claim 26, wherein the starting material is a mixture of piperazine and ethylenediamine in water, and EDA and PIP are present in an amount of from 10 to 50% by weight based on water and in an amount of from 90 to 50% by weight based on the sum of the weights of EDA and PIP.

32. (Currently amended) The process as claimed in claim 31, wherein the reaction is ~~carried out~~ conducted at a temperature ~~in the range~~ of from 290 to 400°C and a pressure ~~in the range~~ of from 0.01 to 10 bar.

33. (Currently amended) The process as claimed in claim 31 ~~or 32~~, wherein EDA and PIP are present in a weight ratio in the range of from 1:1 to 10:1, calculated as the ratio of the weight of EDA to the weight of PIP.